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by reference to recognized pomological groups. If, however, *P. rivularis* is to stand, the date of its publication would give it precedence over *P. hortulana* for that part of the *hortulana* plums represented; but in view of the tendency to abandon *P. hortulana*, this does not appear to be of very much consequence.

It is interesting to note in this connection that *Prunus Texana*,¹² which Scheele erected at the same time as *P. rivularis* from some more Texas material, has not been heard from since, except to be consolidated with the latter by Sereno Watson.¹³

PRUNUS WATSONI Sargent.—Quite a number of cultivated forms of this species, some of them named and catalogued by nurserymen, have recently come under my observation.¹⁴ I have also examined a quantity of herbarium material. It appears to me that it will be very difficult to draw the line between this species and *P. angustifolia*. Even when Sargent's unabridged descriptions of the two species are placed in parallel columns and diligently scrutinized they will be found to yield but a single character of distinction. The calyx lobes of *P. angustifolia* are said to be glandular-ciliate; while of *P. Watsoni* they are said to be eglandular-ciliate; but this distinction cannot be safely applied to the cultivated varieties, as I have had sufficient opportunity to observe. *P. Watsoni* is usually dwarfer, with more zigzag ashy-gray twigs, and with more appearance of thorniness, and usually has smaller leaves with more finely crenulate margins; but none of these characters will serve for critical discrimination. It may even be found necessary in the future to abandon *P. Watsoni* or to reduce it to a variety of *P. angustifolia*; but for the present this species, name, and description seem to be useful in calling attention to a neglected and very interesting group of native plums.—F. A. WAUGH, *Experiment Station, University of Vermont.*

TWO NOTEWORTHY OAKS.

(WITH PLATES V AND VI)

I. A NEW HYBRID.

FOR three seasons I have been observing an oak which grows in the damp sandy woods near the village of Thornton, Ill., six miles

¹² Beiträge zur Flora von Texas. Linn. 21: 593. 1848.

¹³ Bibl. Index. N. A. Bot. 307.

¹⁴ "The Sand Plums," Country Gentleman 63: 68. 1898.

south of the southern limits of Chicago. The difficulty experienced in bringing this type of oak under any described species early led to a suspicion of hybridity, and further observations have confirmed this view. The fact that oaks hybridize somewhat readily is strongly in favor of such a solution, when one or two isolated trees are found in the midst of well-marked species of the ordinary kinds. I find no record of a cross between *Quercus palustris* Du Roi and *Q. coccinea* Wang., which evidently takes places here. Dr. Engelmann¹ reported a hybrid of *Q. palustris* and *Q. imbricaria* found near St. Louis about 1870, an account of which was also given by Alexander Braun.² This appears to be the only case hitherto noted of any hybrid of *Q. palustris*. It is so much more nearly allied in the character of its leaves to *Q. coccinea* than to *Q. imbricaria* as to add to the difficulty of distinguishing a cross between the two if the leaves only are taken into account, and reliance must therefore be placed principally upon other distinctions, though the color of the autumn leaves is a clear gain. This is the only section near Chicago where I find *Q. palustris*, and it appears to reach its northern limit near the southern end of Lake Michigan here, extending eastward into Indiana and southward in Cook and Will counties, Ill., along Thorn creek and its branches. *Q. coccinea* is more abundant than usual in the woods where the hybrid is found and more sharply defined from *Q. velutina* than customary here. Although there are some features that might be better defined by an assumption of a cross of *Q. palustris* with the latter, the acorns and the autumn leaves are much better explained by a cross with the former. In habit and appearance of the trunk the hybrid is so nearly like *Q. palustris* as at first to have been taken for it. It is a tree of recent growth, 4^{dm} in diameter and about 13^m high. The characters are as follows:

Top oblong, the limbs spreading, the lower drooping. Bark of trunk dark gray-brown, tinged with green, close and rather smooth, divided into narrow longitudinal plates, 5–15^{em} long by 2–3^{em} wide. Inner bark coarsely cellular, reddish, colored about like that of *Q. palustris*. Young shoots pubescent, becoming smooth or nearly so in autumn. Branches of the first year brown, tinged with yellow, with small, scattered, slightly raised lenticels. Older branches gray, tinged with red. Winter buds ovate-conical, obtusish, slightly angled, 4–6^{mm} long, pubescent with pale or white hairs. Bud scales oval, obtuse,

¹ Botanical Works 405.

² Bot. Zeit. 29: 202. 1871.

brown or with brown margins. Leaves, when bursting from the bud, densely whitish pubescent. As they expand they spread on rather long petioles like those of *Q. coccinea*, and are thin, light green, and soon smooth above, densely white puberulent beneath, retaining the pubescence longer than on the upper surface. Mature leaves in outline broadly oval or some slightly obovate, 9–12^{cm} long and nearly as wide. They are a light glossy green above, lighter and slightly yellow tinged beneath; smooth except tufts of webby hairs in the axils of the principal veins below, mostly confined to the axils of branches of the mid-vein. They are divided by two deep rounded sinuses on each side, which extend one-half to two-thirds of the way to the midrib. The lobes, except the basal, are somewhat broader above. The lobes are trilobed with shallow rounded sinuses, the terminal lobules three-toothed, the lateral one to three-toothed. The divisions all end in a bristle 4–7^{mm} long. The base of the leaves is truncate or slightly cuneate. Petioles slender, 3–4^{cm} long. Autumn leaves purplish, or spotted with purple, red, or yellow, or many of the leaves scarlet. Male catkins 5–8^{cm} long, hairy; stamens 4 or 5, anthers oblong-oval, retuse or blunt; calyx hairy, 2–4 parted or lobed, frequently 3-parted; segments oval to broad oval or often roundish; they are usually tinged with purple or red. Calyx of the female flower tubular, hairy, tinged with red, six-lobed or cleft. Styles three-parted; stigmas thick, dark and two-lobed. Scales at base of the flower membranaceous. Acorns single or in pairs on peduncles 5–10^{mm} long. The cup is cup-shaped, covering about half the nut, rather thick, contracted at the edge into a thin border, and is yellowish within. Cup scales ovate-oblong, rounded at the apex, slightly pubescent, pale umber colored, with thin margins. When dry they are sometimes loosened near the margin of the cup. Nut globular-ovate, 17–20^{mm} long, 15–17^{mm} wide, pale cinnamon-brown to chestnut color, slightly pubescent, sometimes striped with darker lines.

II. A TERATOLOGICAL SPECIMEN.

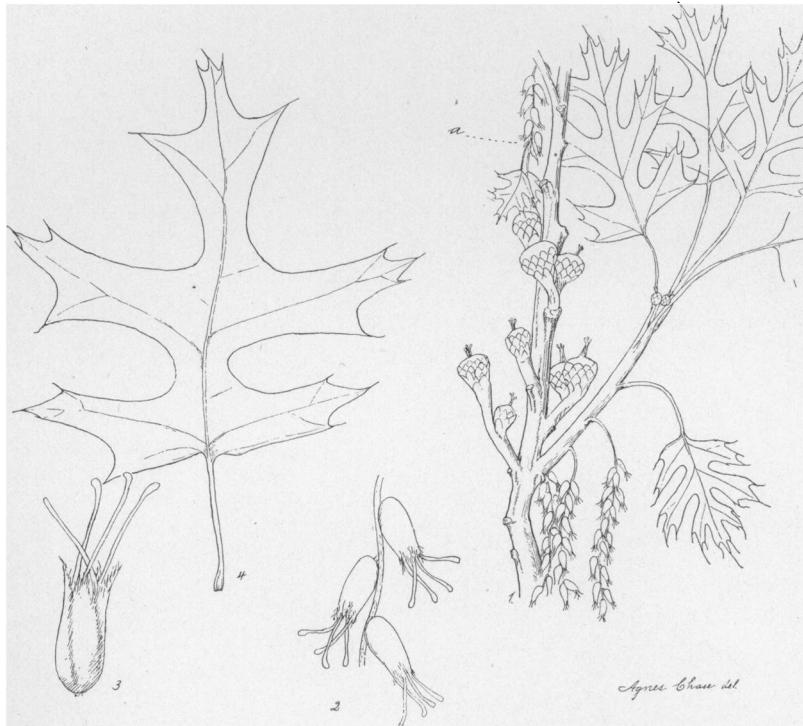
Farther south in the vicinity of Glenwood is a group of three oaks near the bank of Thorn creek. These have proved of special interest on account of their teratological features. They are evidently developed from the stool shoots of an older tree and of an age that would permit such a tree to have been cut down since the settlement of the region, being 2–3^{dm} in diameter. There were originally five,

one having been cut down and one is dead though still standing. Since they are so close as now to be uniting at the base and have the habit of those springing from a stump, this seems the true explanation of the group. This is important for it suggests if it does not imply the same habit in the tree from which they have sprung. The three trees agree in having the stamens, or perhaps more properly, the filaments of the aments transformed into styles. Numerous flowers have been examined without finding any ordinary stamens. Such may be produced as the aments are borne in profusion. Sometimes the styles or transformed filaments are a little enlarged at the base, but no ovules or traces of them have been found. A minute embryological investigation has not been undertaken. Another teratological feature is the branching or forking of the rachis, or the production of leaves at its end. In this is seen a tendency of the ament to change its function from the reproductive to the vegetative. Since the styles are transformed filaments or substitutes for them, it may be asked, in the case of a monoecious plant at least, whether the male or female element is at the farthest remove from the vegetative. These aments are short lived, lasting about as long as ordinary male aments. The normal pistillate flowers are also regularly produced, and since the trees ripen an abundance of acorns the change in no way seems to interfere with their reproductive power. Cross fertilization becomes a necessity in this case, the trees being functionally dioecious. Since this habit of the trees has been verified three springs in succession, it may be looked upon as fixed. In character they accord best with *Q. coccinea*, but are not typical, being one of the forms which closely approach *Q. velutina*. A detailed description of its peculiarities is subjoined.

Aments producing styles or pistils in place of stamens. They are from 1-3^m long including the peduncle, which is usually short, in some cases 1^m long. Styles four or five, mostly four, flattened, about 2^{mm} long, projecting considerably beyond the rim of the calyx. The base is hairy, dark colored, and when enlarged oblong. They are paler above, slightly curved outward, with the tip usually enlarged like a stigma, but smaller than the stigmas of the normal flower. The enlargement is commonly confined to three as if representing the three styles of the fertile flower. The calyx is hairy, narrowly urceolate, the four or five segments united two-thirds or three-fourths of the way to the top. Its shape is more like that of the pistillate flower than the more open and campanulate calyx of the stamine flower. In



HILL on *QUERCUS COCCINEA* × *PALUSTRIS*.



HILL on an ABNORMAL OAK.

some aments the rachis ends in a leafy shoot. One examined had three leaves, one of them small and rudimentary, two being lobed and toothed, the blade 8^{mm} long by 2 or 3^{mm} wide, on petioles 3 or 4^{mm} long (fig. 1, a). Another ament was found 15^{mm} long, branched near the top, one branch bearing transformed stamens, the other with a leaf similar to the above but slightly larger.—E. J. HILL, *Chicago*.

EXPLANATION OF PLATES V, VI.

PLATE V. Quercus coccinea × palustris.

FIG. 1. Flowering branch, natural size.

FIG. 2. Pistillate flower. $\times 6$.

FIG. 3. Staminate flower. $\times 6$.

FIG. 4. Leaf, natural size.

FIG. 5. Acorns, natural size.

PLATE VI. Teratological form.

FIG. 1. Flowering branch, natural size.

FIG. 2. Portion of ament. $\times 6$.

FIG. 3. Flower. $\times 12$.

FIG. 4. Leaf, reduced one-half.